

REMARKS

At the outset, the Examiner is thanked for the thorough review and consideration of the pending application. The Office Action dated September 7, 2005 has been received and its contents carefully reviewed.

Claims 1-32 are currently pending. Reexamination and reconsideration of the pending claims is respectfully requested.

In the Office Action, claims 1-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,043,511 to Kim (hereinafter "Kim") in view of U.S. Publication No. 2002/0117691 to Choi et al. (hereinafter "Choi").

The rejection of claims 1-32 as being unpatentable over Kim in view of Choi is respectfully traversed and reconsideration is requested.

Independent claims 1 and 17 are allowable over Kim in view of Choi in that the claims each recite a combination of elements including, for example, "the gate electrode, the gate line and the gate pad electrode have a double-layered structure ...wherein the first copper layer is on the first barrier metal layer...the data line, the source and drain electrodes, ...and the data pad electrode have a double-layered structure...wherein the second copper layer is on the second barrier metal layer." None of the cited references, singly or in combination, teaches or suggests at least these features of the claimed invention.

Specifically, present claims 1 and 17 are different from the modified invention of Kim in that in claims 1 and 17 "the gate electrode, the gate line and the gate pad electrode have a double-layered structure...wherein the first copper layer is on the first metal barrier layer." In contrast, Kim merely teaches a double layered structure of Al-Nd and Mo or Cr and Al-Nd. See column 6, lines 55-65; Fig. 13A. Kim does not teach "a first copper layer," as acknowledged by the Examiner on page 3 of the Office Action. Also, Kim does not teach "a first barrier metal layer." The Examiner states on page 2 of the Office Action that "Cr [is a] first metal barrier layer." However, Kim does not teach or suggest that the Cr layer is "a first barrier metal layer"

or could function as “a first barrier metal layer” for the Al-Nd layer. That is, Kim is silent with respect to the “first barrier metal layer.”

Furthermore, present claims 1 and 17 are different from the modified invention of Kim in that in claims 1 and 17 “the data line, the source and drain electrodes ...and the data pad electrode have a double-layered structure...wherein the second copper layer is on the second barrier metal layer.” Kim does not teach these features, as acknowledged by the Examiner on page 3 of the Office Action.

Applicant respectfully submits Choi fails to cure the deficiencies of Kim. Choi merely discloses a double-layered data line assembly where the bottom layer may be formed of copper and the top layer may be formed of chrome. See paragraph [0125]. Choi discloses a double-layered gate line assembly formed on a buffer layer where the bottom layer may be formed of copper and the top layer may be formed of chrome. See paragraph [0132]. Therefore, Choi does not teach “the first copper layer is on the first metal barrier layer” or “the second copper layer is on the second barrier metal layer.” Choi teaches that copper is a lower layer in both the gate line assembly and the data line assembly. Thus, there is no teaching or suggestion in Choi that a copper layer is formed on a barrier metal layer. The Examiner alleges on page 6 of the Office Action that “Choi discloses the use of a double-layered structure...wherein one layer is a barrier metal layer...” However, Choi is silent with respect to a “barrier metal layer.” Indeed, since the copper is the lower layer in both line assemblies, the top layer is not a “barrier metal layer” and cannot function as a “barrier metal layer.” Therefore, Choi does not cure the defects associated with Kim.

The Examiner states on pages 6-7 that “one of ordinary skill in the art would come up with a double-layered structure...wherein one layer is a barrier metal layer and the other is a copper layer wherein the copper layer is on the other layer.” However, as discussed above, the cited references are completely silent with respect to a “barrier metal layer” and do not teach or suggest “the first copper layer is on the first metal barrier layer” or “the second copper layer is on the second barrier metal layer.” Therefore, one of ordinary skill in the art could not be motivated to form the structure recited in claim 1.

Furthermore, Applicant respectfully submits that there is no motivation for one of ordinary skill in the art to combine Kim and Choi and arrive at the claimed invention with any reasonable expectation of success. Kim is drawn to decreasing the number of photolithography

steps, while Choi is drawn to reducing parasitic capacitance when increasing the opening ratio of liquid crystal displays. One of ordinary skill in the art would not look to issues with parasitic capacitance or opening ratio to aid in reducing photolithography steps. Therefore, Applicant respectfully submits that Kim and Choi are non-analogous art for purposes of analyzing the obviousness of the subject matter at issue. Applicant further respectfully submits that the motivation to combine the references comes from the present invention, and not from Kim or Choi, which is impermissible. Accordingly, Applicant respectfully submits that claim 1, claims 2-16 which depend therefrom, claim 17, and claims 18-32 which depend therefrom, are allowable over Kim in view of Choi.

Applicants believe the foregoing remarks place the application in condition for allowance and early, favorable action is respectfully solicited.

If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is requested to call the undersigned attorney at (202) 496-7500 to discuss the steps necessary for placing the application in condition for allowance. All correspondence should continue to be sent to the below-listed address.

If these papers are not considered timely filed by the Patent and Trademark Office, then a petition is hereby made under 37 C.F.R. §1.136, and any additional fees required under 37 C.F.R. §1.136 for any necessary extension of time, or any other fees required to complete the filing of this response, may be charged to Deposit Account No. 50-0911. Please credit any overpayment to deposit Account No. 50-0911. A duplicate copy of this sheet is enclosed.

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Respectfully submitted,

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